4. (a) (i) What do you mean by feedback in an amplifier? Derive an expression for voltage gain A_f when subjected to negative feedback.

(ii) Write a short note on distortion and noise in an amplifier.

(iii) What is the difference between voltage feedback and current feedback? State the advantage of negative feedback.

(iv) A transistor amplifier has a voltage gain of 50. The input resisrtance of the amplifier is 1 kW. The amplifier is now provided with 5% negative feedback in series with the input. Calculate the voltage gain and input impedance with feedback. (1+2)+3+(2+1)+3=12

(OR)

(b) (i) With a neat sketch of circuit diagram explain the action and working of Colpitt's oscillator. Derive the expression for the frequency of oscillations.

(ii) Explain the principle of operation of a weighted-resistor D/A Converter.

(iii) What is the frequency of Hartley's oscillator if total inductance is 80μH and capacitance 180μF?

(3+3)+4+2=12

4. (a) (i) Draw a neat circuit diagram of a two stage *RC* coupled transistor amplifier. Discuss qualitatively its frequency response characteristics.

(ii) Explain the action of Hartley oscillator.

(iii) Show that the negative feedback can improve the stability of gain of an amplifier.

5+4+3=12

(b) (i) Why are RC oscillators commonly used in laboratory?

(ii) Explain the operation of a phase oscillator and find its frequency of oscillation.

(iii) Draw the block diagram of a successive approximation type A/D Converter. Explain its operation.

(iv) A 4 bit D/A converter produces an output of 4.5V for an input code of 1001. Find the output for an input code 1110.

2+4+4+2=12

4. (a) (i) Explain the importances of positive feedback and negative feedback in electronics circuit.

(ii) Define the following in relation to feedback amplifier :
Stability, Distortion and Noise

(iii) With a neat circuit diagram, explain the working of Hartley oscillator. Derive its frequency of oscillation. 3+3+(3+3)=12

(OR)

(b) (i) Draw a circuit diagram for *RC* phase shift oscillator and explain its operation. Calculate its frequency of oscillation.

(ii) Draw a circuit diagram of A/D converter and explain its operation.

(iii) What is Barkhausen criterion for self-sustained oscillations?

(2+2+2)+4+2=12